

differing from true tannin in some respects. He considers these tannin-like substances as meaningless waste products, which upon oxidation give rise to the brown pigment of this group of plants (phycophaein), which was formerly considered a pigment of the chromatophore.—WM. CROCKER.

**Apogamy in *Nephrodium*.**—STEIL<sup>14</sup> has uncovered an interesting situation in *Nephrodium hirtipes*, in that the gametophyte never produces archegonia, although antheridia with normal sperms are developed. Secondary gametophytes were induced readily, but only rarely was apospory induced. The embryo begins to develop early in the history of the gametophyte as a vegetative outgrowth, the apical cells of leaf, root, and stem appearing successively, but no foot is formed. No migrations or fusions of nuclei were observed in connection with embryo development. The diploid number of chromosomes is 120-130, and the haploid number (60-65) was observed both in the gametophyte and the apogamous sporophyte. Suggestions are offered as to the origin of such persistent apogamy, the most interesting one being that *N. hirtipes* and other apogamous ferns may be of hybrid origin. The paper is introduced by a very useful summary of our knowledge of apogamy in ferns, beginning with the discovery of tracheids in the gametophyte of *Pteris sulcata* by LESZYC-SUMINSKI in 1848. The first clear recognition of an apogamous embryo, however, as distinguished from one resulting from fertilization, is credited to FARLOW, who in 1874 discovered apogamy in *Pteris cretica albo-lineata*.—J. M. C.

**Soil acidity.**—HARTWELL and PEMBER<sup>15</sup> find that rye does well on acid soils, while barley is much injured by them. Aqueous extract of acid soil, residue from distillate of the aqueous extract, and the ash of the residue from such distillate affect the two plants much as does the soil itself. Soluble aluminum salts and not the acid in the soils proved to be the source of injury to the barley plants. Addition of acid phosphates, which renders the soil more acid, and lime reduced the solubility of the aluminum salts in acid soils and rendered them non-toxic to barley plants. The authors think these substances often produce beneficial effects in this way rather than by furnishing more available phosphorus or by neutralizing the acid. The reviewer has noticed that the hydrogen ion concentration found in acid soils by the gas chain method is generally only a fraction of the hydrogen ion concentration necessary to reduce the growth rate of plants in water or sand cultures. This work again suggests the complexity of the apparently simple problem of soil acidity.—WM. CROCKER.

<sup>14</sup> STEIL, W. N., A study of apogamy in *Nephrodium hirtipes*. Ann. Botany 33: 109-132. pls. 5-7. 1919.

<sup>15</sup> HARTWELL, B. L., and PEMBER, F. R., The presence of aluminum as a reason for the difference in the effect of the so-called acid soil on barley and rye. Soil Science 6: 259-279. 1918.